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Then for any chemical equation:

$$c = 2x + r$$

$$\frac{c}{y} \text{ or } k = \frac{2x}{y} + \frac{r}{y}$$

$ky - 2x = r$ , which is an expression in which the difference between  $x$  and  $y$  is fixed by  $k$  and  $r$ .

The preponderance of binary and ternary compounds in inorganic chemistry, with occasional appearance of single elements would readily lead one to give  $k$  an average value in the neighborhood of 2.25. The actual average for  $k$  in the fifty equations referred to above is 2.285, the extreme values being 1.5 and 3.1.

The repetition of acid radicals in many of the reagents of inorganic chemistry, coupled with the fact that it is seldom possible to determine the products of a reaction amongst more than three substances, results in an average value of  $r$ , not far from that for  $k$ . Actual average for fifty equations is 2.44.

These average values for  $k$  and  $r$  require that the average value for  $x$  and  $y$  should not differ widely.

HARRY A. CURTIS

SOUTH CLINCHFIELD,  
VIRGINIA

## THE IOWA ACADEMY OF SCIENCE

THE academy held its thirty-sixth annual session with Drake University, Des Moines, on Friday and Saturday, April 28 and 29. After a short business meeting President Morehouse gave his presidential address on "The cosmology of the universe." The academy then divided into sections for the reading of papers, and at six o'clock the sections met for dinners. In the evening President Edgar O. Lovett, of Rice Institute, Houston, Texas, gave the public address on "Some aspects of science." This address and the reception which followed were given at the splendid new municipal observatory, built by the city of Des Moines in one of its public parks and dedicated to Dr. Morehouse, the astronomer of Drake University. Opportunity was given the members for inspecting the equipment of the observatory and seeing the stars through the nine-inch telescope.

On Saturday morning the sections resumed

their meetings, and at ten o'clock the academy convened to hear some papers of general interest. The following were elected as officers for the ensuing year:

*President*, R. B. Wylie, State University, Iowa City; *vice-president*, O. H. Smith, Cornell College, Mount Vernon; *secretary*, James H. Lees, Geological Survey, Des Moines; *treasurer*, A. O. Thomas, State University; *chairmen of sections*: *Botany*, H. S. Conard, Grinnell College, Grinnell; *chemistry*, Edward Bartow, State University; F. E. Brown, State College; *geology*, S. L. Galpin, State College, Ames; *mathematics*, C. W. Emons, Simpson College, Indianola; *physics*, L. D. Weld, Coe College, Cedar Rapids; *zoology*, H. W. Norris, Grinnell College.

Resolutions were adopted favoring reforestation and conservation, and opposing the transfer of public forests to the Department of the Interior.

The following papers were presented:

### ARCHEOLOGY

*The new Albin inscribed tablet*: ELLISON ORR.  
*Decorative markings on some fragments of Indian pottery from Mills County, Iowa*: PAUL R. ROWE.

### GEOLOGY

*Recent studies of the Pleistocene in western Iowa*: G. F. KAY.

*Till-like deposits south of Kansas River in Douglas County, Kansas*: WALTER H. SCHOEWE.  
*Status of sedimentation in Iowa*: A. C. TROWBRIDGE.

*Origin of limestone conglomerates*: MISS LOUISE FILLMAN.

*Classification of lenses*: MISS LOUISE FILLMAN.  
*Notes on some mammalian remains reported in Iowa during the past year*: A. O. THOMAS.

*Records of Paleozoic glass-sponges in Iowa*: A. O. THOMAS.

*An Iowa Cambrian eurypterid*: O. T. WALTER.  
*The Laramie hiatus in the southern Rockies*: CHARLES KEYES.

*Horizontal oblique faulting in inclined strata*: CHARLES KEYES.

*Taxonomic rank of Pennsylvanian grouping*: CHARLES KEYES.

*A deposit of pyrites in coal*: JOHN M. LINDLY.  
*The deep well at Winfield*: JOHN M. LINDLY.

*The structure of the Fort Dodge beds*: JAMES H. LEES.

*The area near Stuart, Iowa*: JOHN L. TILTON.

*Some Black River brachiopods from the Mississippi Valley:* CARROLL LANE FENTON and MILDRED ADAMS FENTON.

*Oil prospects in Iowa:* JOHN E. SMITH.

*The Rockford geodes:* SIDNEY L. GALPIN.

#### MATHEMATICS

#### IOWA SECTION, MATHEMATICAL ASSOCIATION OF AMERICA

*The method of averages:* G. W. SNEDECOR.

*Mathematical bulletins:* T. M. BLAKESLEE.

*Topics in general analysis:* E. W. CHITTENDEN.

*The place of the equation in a scheme of education:* C. W. WESTER.

*Pre-symmetric determinants whose elements are finite sums:* E. R. SMITH.

*On the meaning of the classification of statistical series by means of the Lexis ratio:* H. L. RIETZ.

*Definitions of imaginary and complex numbers:* E. S. ALLEN.

*An extension of the figurate numbers:* J. F. REILLY.

#### PHYSICS

*A redetermination of the principal reflecting powers of isolated selenium crystals:* L. P. SIEG.

*Solubility and polarity:* WILLIAM KUNERTH.

*A comparison of intensities required under direct and under indirect lighting systems:* WILLIAM KUNERTH.

*Coefficients of diffusion of salt vapors in the Bunsen flame:* GEORGE E. DAVIS.

*The path of a rigid electron which moves in a magnetic field of constant strength rotating with constant angular velocity:* E. O. HULBURT.

*Phenomena in gases excited by radio frequency currents:* E. O. HULBURT.

*The broadening of the Balmer lines of hydrogen with pressure:* E. O. HULBURT.

*Nodal distances in acoustics:* G. W. STEWART.

*A variable single band acoustic filter:* G. W. STEWART.

*A new form of telephone receiver and transmitter:* C. W. HEWLETT.

*The scattering of X-rays by light elements:* C. W. HEWLETT.

*The attenuation factor in acoustic wave filters:* H. B. PEACOCK.

*The Hall effect and specific resistance of evaporated films of silver, copper and iron:* J. C. STEINBERG.

*Effect of automobile headlight lenses by box photometer method:* D. M. SMITH.

#### ZOOLOGY

*Iowa microlepidoptera:* A. W. LINDSEY.

*Brood "A" of the white grub extends its range in Iowa:* H. E. JAKES.

*A study of the eggs of the white-marked tussock moth:* MISS SUSANNAH POULTER and H. E. JAKES.

*A scribifacilograph for labelling kymographic tracings:* T. L. PATTERSON.

*Effects of stretch on smooth muscle responses:* B. M. HARRISON.

*Observations on the habits of a tarantula in captivity:* ALBERT HARTZELL.

*Some recently published errors respecting the cranial nerves of the dogfish:* H. W. NORRIS.

*Cranial nerve components in *Amia*, *Lepidosteus*, *Polyodon* and *Scaphirhynchus*:* H. W. NORRIS.

*Morphological studies on the injury to apple caused by *Ceresa bubalis*:* J. C. GOODWIN and F. A. FENTON.

*Some hereditary pathogens:* W. E. SANDERS.

*Some notes on *Empoasca flavescens*:* R. L. WEBSTER.

*Simultaneous fast and slow drum records of fatigue:* F. M. BALDWIN.

*Nest-digging and egg-laying habits of Bell's turtle:* FRANK A. STROMSTEN.

*Notes on some of the rarer birds of the Ames region:* H. E. EWING.

*Bird records of the past two winters, 1920-1922, in the upper Missouri valley:* T. C. STEPHENS.

*Sociology as a science:* HORNELL HART.

*Chance in development as a cause of variation:* P. W. WHITING.

*Criteria of superior intelligence:* REUEL H. SYLVESTER.

*The mental and physical status of children entering the public schools:* J. E. EVANS.

*Behavior of trapped and banded birds:* DAYTON STONER.

#### BOTANY

*A comparative study of the common and red-seeded dandelions:* MISS JUNE BERRY.

*Some influences of the submarginal vein in leaves:* ROBERT B. WYLIE.

*The sperms of *Vallisneria spiralis*:* ROBERT B. WYLIE.

*Types of wound healing in certain foliage leaves:* ROBERT B. WYLIE.

*Morphology of the vein-islet in certain dicotyledons:* SARA I. LEWIS.

*Bud characters of native trees of Jasper County, Iowa:* F. P. SIPE.

*The American Lotus:* L. H. PAMMEL.

*Some observations on the plants of the Sierras:* L. H. PAMMEL.

*Further studies on the germination of trees and shrubs:* L. H. PAMMEL and MISS CHARLOTTE M. KING.

*The effect of weeds upon crop production:* A. L. BAKKE and L. H. PAMMEL.

*Notes on species of Rhamnus of southwestern United States and California and the occurrence of Puccinia coronata:* L. H. PAMMEL.

*Structure and function of the stigma in relation to the germinative requirements of the pollen in the Easter lily:* J. N. MARTIN, FRED C. WERKENTHIN and MISS ELIZABETH HUDSON.

*The structure and development of the seed coat and cause of delayed germination in Mellilotus alba:* J. N. MARTIN.

*The genus Cucurbita—Its origin, description and key to the species:* FRED C. WERKENTHIN.

*The relation of the mosaic diseases of wild catnip and cultivated cucumbers:* J. H. MUNCIE.

*Studies of insect transmission and cross-inoculation of mosaic on the Solanaceæ, Cucurbitaceæ and Leguminaceæ:* O. H. ELMER.

*Nodal infection of corn by diplodia:* L. W. DURRELL.

*Effect of hardness of water on the fungicidal value of mercuric chloride solutions:* J. C. GILMAN.

*A manual of ferns and "fern allies" of Grinnell and vicinity:* HENRY S. CONARD.

*A manual of gymnosperms (evergreens) of Iowa:* HENRY S. CONARD.

*Parry's Catalog of Iowa Plants of 1848:* MISS WINNIFRED ELLSWORTH.

#### CHEMISTRY

IOWA AND AMES SECTIONS, AMERICAN CHEMICAL SOCIETY

*A study of dolomites from the Austrian Tyrol:* NICHOLAS KNIGHT.

*The role of organic chemistry in plant and animal therapy:* HENRY GILMAN.

*A new method for the introduction of an ethyl group:* RACHEL HOYLE, JOHN B. SCHUMAKER and HENRY GILMAN.

*A rapid and inexpensive electrolytic determination of copper without the use of platinum cathode:* STEPHEN POPOFF and T. C. TUCKER.

*Inexpensive apparatus for use in large classes of quantitative analysis:* STEPHEN POPOFF.

*The electrometric titration of tin. Critical study of the standardization of solutions for use in titration of tin:* STEPHEN POPOFF and F. L. CHAMBERS.

*The color of soils as an indication of plant food content and fertility:* P. E. BROWN,

*A chemical classification of the activities of soil micro-organisms:* PAUL EMERSON.

*Water purification in Iowa:* JACK J. HINMAN, JR.

*The electrometric determination of sulfurous acid with permanganate:* W. S. HENDRIXSON and L. M. VERBECK.

*The electrometric standardization of titanium solutions:* W. S. HENDRIXSON and L. M. VERBECK.

*The electrometric titration of organic acids:* J. H. BUCHANAN and C. J. MEISTER.

*The effect of the introduction of steam into stop end retorts in the manufacture of coal gas:* GEORGE W. BURKE.

*A note on lantern slide making:* E. W. ROCKWOOD.

*The relation of high school chemistry to college chemistry:* EDWARD BARTOW.

*Studies on Yeast IV. On the presence of the antineuritic and the growth promoting vitamins in yeast grown in a synthetic medium:* V. E. NELSON, E. I. FULMER and V. G. HELLER.

*Studies on Yeast V. Is bios a single substance?* E. I. FULMER and V. E. NELSON.

*A solubility survey—(1) An apparatus for the determination of solubility up to the periodic system: P. A. BOND. (2) A cross section of the periodic system—solubilities in sulfur dioxide: M. C. WADDELL with P. A. BOND.*

*Diacyl derivatives of ortho aminonaphthols:* L. CHARLES RAIFORD and K. C. ARMSTRONG.

*The cost of softening water with various soaps:* O. R. SWEENEY and ROBERT MCKINNEY.

*The possibilities of the commercial utilization of corn cobs:* O. R. SWEENEY and H. V. WRIGHT.

*Alkyl sulfates—(1) Studies on the equilibrium between alcohols and sulfuric acid, and the sulfates and water: HARRY F. LEWIS. (2) The relative hydrolysis of the sulfates by water and acids: H. F. LEWIS and O'NEAL MASON. (3) The influence of molecular weights on the hydrolysis: H. F. LEWIS and ARTHUR DAMEROW.*

*Further data on the vitamin "A" content of white and yellow corn:* A. R. LAMB.

*The colorimetric determination of hardness in water:* H. F. LEWIS and ARTHUR DAMEROW.

*Recent attempts to disintegrate the atom:* GERALD L. WENDT and CLARENCE E. IRION.

*The decomposition of potassium chlorate. I. Spontaneous decomposition temperatures. II. The effect of pressure on decomposition:* F. E. BROWN, J. AUSTIN BURROWS and H. M. McLAUGHLIN.

JAMES H. LEES,  
Secretary